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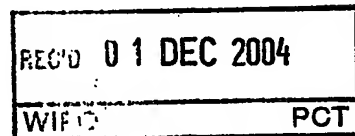
*Certificate*

REPUBLIC OF SOUTH AFRICA

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the documents annexed hereto are true copies of:

Application forms P.1 and P.3, provisional specification and drawings of  
South African Patent Application No. 2003/7749 as originally filed in the  
Republic of South Africa on 3 October 2003 in the name of INTERNATIONAL  
TECHNOLOGIES,LLC for an invention entitled: " BLASTING AND BLASTING  
ACCESSORY ".

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Registrar of Patents

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PRETORIA

PATENTS ACT, 1978  
**DECLARATION AND POWER OF ATTORNEY**  
(Section 30 - Regulation 8, 22(i)(c) and 33)

PATENT APPLICATION NO		
21	01	

A&A Ref: SCF/cve  
V15965

LODGING DATE	
22	3 October 2003

FULL NAME(S) OF APPLICANT(S)	
71	INTERNATIONAL TECHNOLOGIES, LLC

FULL NAME(S) OF INVENTOR(S)	
72	HEINKE, Nils Alberto SKAGGS, Roger Dean COLLINSWORTH, Stephen Mitchell

EARLIEST PRIORITY CLAIMED	COUNTRY	NUMBER	DATE
	33	31	32

NOTE: The country must be indicated by its International Abbreviation - see schedule 4 of the Regulations


TITLE OF INVENTION	
54	BLASTING AND BLASTING ACCESSORY

\* I/We HEINKE, Nils Alberto

hereby declare that :-

1. ~~I/we am/are the applicant(s) mentioned above;~~
- \*\* 2. I/we have been authorized by the applicant(s) to make this declaration and have knowledge of the facts herein stated in the capacity of President of the applicant(s);
- \*\*\* 3. the inventor(s) of the abovementioned invention is/are the person(s) named above and the applicant(s) has/have acquired the right to apply by virtue of an assignment from the inventor(s);
4. to the best of my/our knowledge and belief, if a patent is granted on the application, there will be no lawful ground for the revocation of the patent;
- \*\*\*\* 5. ~~this is a convention application and the earliest application from which priority is claimed as set out above is the first application in a convention country in respect of the invention claimed in any of the claims; and~~
6. the partners and qualified staff of the firm of ADAMS & ADAMS, patent attorneys, are authorised, jointly and severally, with powers of substitution and revocation, to represent the applicant(s) in this application and to be the address for service of the applicant(s) while the application is pending and after a patent has been granted on the application.

SIGNED THIS 30 DAY OF September 2003

  
Company Name: INTERNATIONAL TECHNOLOGIES, LLC  
Full Names: HEINKE, Nils Alberto  
Capacity: President

(no legalization necessary)

- \* In the case of application in the name of a company, partnership or firm, give full names of signatory/signatories, delete paragraph 1, and enter capacity of each signatory in paragraph 2.  
\*\* If the applicant is a natural person, delete paragraph 2.  
\*\*\* If the right to apply is not by virtue of an assignment from the inventor(s), delete "an assignment from the inventor(s)" and give details of acquisition of right.  
\*\*\*\* For non-convention applications, delete paragraph 5.

REPUBLIC OF SOUTH AFRICA  
PATENTS ACT, 1978  
APPLICATION FOR A PATENT AND  
ACKNOWLEDGEMENT OF RECEIPT  
(Section 30(1) Regulation 22)

REPUBLIC OF SOUTH AFRICA	
FORM P.1	REVENUE
(to be lodged in duplicate)	
03.10.03	R 060.00
APPLICANT	
INKOMSTE	
A&A REF V19905 SCP/CMS	

THE GRANT OF A PATENT IS HEREBY REQUESTED BY THE UNDERMENTIONED APPLICANT  
ON THE BASIS OF THE PRESENT APPLICATION FILED IN DUPLICATE

21 01 PATENT APPLICATION NO 2003/7749

71 FULL NAME(S) OF APPLICANT(S)

INTERNATIONAL TECHNOLOGIES, LLC.

ADDRESS(ES) OF APPLICANT(S)

Route 1, Box 328-50, Elkins, WV 26241, United  
States of America

54 TITLE OF INVENTION

BLASTING AND BLASTING ACCESSORY

Only the items marked with an "X" in the blocks below are applicable.

☐ THE APPLICANT CLAIMS PRIORITY AS SET OUT ON THE ACCOMPANYING FORM P.2. The earliest priority claimed is

Country:

No:

Date:

☐ THE APPLICATION IS FOR A PATENT OF ADDITION TO PATENT APPLICATION NO 21 01

☐ THIS APPLICATION IS A FRESH APPLICATION IN TERMS OF SECTION 37 AND BASED ON  
APPLICATION NO 21 01

THIS APPLICATION IS ACCOMPANIED BY:

- |                                     |  |
|-------------------------------------|--|
| <input checked="" type="checkbox"/> | A single copy of a provisional specification of 12 pages                         |
| <input checked="" type="checkbox"/> | Drawings of 5 sheets   |
| <input type="checkbox"/>            | Publication particulars and abstract (Form P.8 in duplicate) (for complete only) |
| <input type="checkbox"/>            | A copy of Figure of the drawings (if any) for the abstract (for complete only)   |
| <input type="checkbox"/>            | An assignment of invention   |
| <input type="checkbox"/>            | Certified priority document(s). (State quantity)                                 |
| <input type="checkbox"/>            | Translation of the priority document(s)  |
| <input type="checkbox"/>            | An assignment of priority rights   |
| <input type="checkbox"/>            | A copy of Form P.2 and the specification of RSA Patent Application No 21 01      |
| <input checked="" type="checkbox"/> | Form P.2 in duplicate  |
| <input type="checkbox"/>            | A declaration and power of attorney on Form P.3                                  |
| <input type="checkbox"/>            | Request for ante-dating on Form P.4  |
| <input type="checkbox"/>            | Request for classification on Form P.9   |
| <input type="checkbox"/>            | Request for delay of acceptance on Form P.4                                      |
| <input type="checkbox"/>            | Extra copy of informal drawings (for complete only)                              |

74 ADDRESS FOR SERVICE: Adams & Adams, Pretoria

Dated this 3rd day of October 2003

ADAMS & ADAMS  
APPLICANTS PATENT ATTORNEYS

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REPUBLIC OF SOUTH AFRICA  
Patents Act, 1978

## PROVISIONAL SPECIFICATION

(Section 30 (1) - Regulation 27)

21	01	OFFICIAL APPLICATION NO
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2003/7749

22	LODGING DATE
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3 October 2003

71	FULL NAME(S) OF APPLICANT(S)
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INTERNATIONAL TECHNOLOGIES, LLC.

72	FULL NAME(S) OF INVENTOR(S)
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HEINKE, Nils Alberto  
SKAGGS, Roger Dean  
COLLINSWORTH, Stephen Mitchell

54	TITLE OF INVENTION
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BLASTING AND BLASTING ACCESSORY

5           THIS INVENTION relates to a method of blasting or rock breaking,  
and to an accessory for use in blasting or rock breaking.

          This invention is expected to be applicable particularly  
advantageously in the field of mining, but it is not limited to that field.

10

          For purposes of this specification, the terms "blasting" and  
"explosive" and derivatives are used for convenience. Those terms should be  
interpreted widely, to incorporate also the general meanings respectively of  
blowing up rocks or other destructive actions by means of agents other than  
15 explosives, e.g. also by means of a propellant; and of a destructive agent other  
than an explosive, e.g. including also a propellant.

          In accordance with a first aspect of this invention, there is  
provided a method of blasting or breaking rock or other materials by means of  
- 20 pressure / shock wave generation in a tamped drill-hole; the method including  
forming a stemming plug by holding a stemming material in a container at  
a predetermined spacing from a surface by means of a frangible spacer abutting  
said surface and corresponding to said predetermined spacing and being  
connected to the container, the container and the spacer forming a blasting  
25 accessory;

          holding an explosive, i.e. a pressure generating or shock wave generating  
substance, adjacent the container remote from said surface;

initiating said explosive to cause the blasting accessory and stemming material to be displaced at speed toward said surface.

5 The pressure generating or shock wave generating substance may be an explosive in the narrow or true sense of the word.

The container may be closeable. It may have a defined volume for containing a correspondingly defined volume of stemming material.

10 The stemming material may be drill cuttings.

The method may be performed in a drill hole which extends downwardly, e.g. generally vertically downwardly, the method then providing the blasting accessory to have a profile slightly smaller than a diameter of the  
15 drill hole and causing the blasting accessory to fall under gravity toward said surface.

The method may include providing a seal formation in conjunction with the container, the seal formation being deformable, the method including  
--- 20 --- deforming the seal formation to block the drill hole when the seal formation is in position, and locating a pressure or shock wave generating substance at said position in the drill hole. The method may include providing the seal formation to be in the form of an inverted skirt when positioned and flaring the skirt to cause sealing by pressure exerted by or via the pressure or shock wave  
25 generating substance.

The invention extends to a blasting accessory suitable for use in a drill hole, the accessory including

a container which is closable for holding a predetermined volume of stemming material in the form of a plug;

5 a spacer proximate the container and extending away from the container a predetermined distance, the spacer having a free end remote from the container for abutting a surface in use.

The container may include an openable and closable closure.

10 The accessory may conveniently and advantageously be round, the accessory having a profile which is of a predetermined diameter commensurate with a diameter of a drill hole for which the accessory is intended. The accessory may thus be of generally round tubular shape, the spacer being in the  
15 form of a tube having an open free end, and a vent hole remote from the free end.

The container may be tubular, fitting spigot-socket fashion, or in the manner of a pharmaceutical capsule, over an end of the spacer. One end  
20 portion of the container which is a securing end portion may thus be in the form of an open-ended sleeve fitting over an end of the spacer. Instead, it may be in the form of a spigot fitting within a socket at an end of the spacer.

25 An opposed end portion of the container which is a container end portion may be closeable to hold the stemming material. The end portions may be divided by means of a shoulder arranged to abut the spacer to set the depth.

of overlapping and thus the volume of the container. The container end portion may have a larger diameter to cause it to fit snugly within the drill hole.

5 The accessory, by way of development, may include a deformable seal formation in the form of a rim for sealing against an inner periphery of the drill hole to form a plunger for holding a blasting substance (e.g. a pressure generating or shock wave generating substance) adjacent the container remote from the spacer. The deformable rim may be in the form of an inverted skirt. It may have longitudinal slits to render it deformable or to facilitate deformation.

10 The accessory may be suitable for use in "wet" drill holes, i.e. drill holes containing water at their bottoms, the spacer then having small volume so as to displace the water at the bottom of the drill hole minimally. The stem may be in the form of an open ended tube.

15 The accessory may be in the form of a moulding of synthetic polymeric material. It may be in the form of an injection moulding.

20 The invention is now described by way of example with reference to the accompanying diagrammatic drawings. In the drawings

Figure 1 shows, in sectional, dismantled view, an accessory in accordance with the invention;

25 Figure 2 shows, in a view corresponding to Figure 1 but being assembled, another embodiment of an accessory in accordance with the invention;

Figure 3 shows, in sectional view, a variant embodiment of a container for the accessory of Figure 2;



Figure 4 shows yet a further, developed embodiment of an accessory in accordance with the invention in a view corresponding to the view of Figure 2;

Figures 5 and 6 show, in sectional views, the accessory of Figure 4 located respectively in a relatively narrow and in a relatively wide drill hole; and

5 Figure 7 shows, in sectional view, fragmentarily, the accessory of Figure 4, extended.

With reference to Figure 1 of the drawings, an accessory in accordance with the invention is generally indicated by reference numeral 10. The accessory is suitable for use in blasting operations in a drill hole.

15 The accessory 10 is generally of round tubular shape comprising a container generally indicated by reference numeral 12, and a spacer generally indicated by reference numeral 30, the container 12 and the spacer 30 being provided in series. It further comprises a lid, generally indicated by reference numeral 20, for the container 12.

The container 12 is formed within a tubular wall 14 above a transverse floor 16 extending across the tubular wall 14. The tubular wall 14 is open ended opposite to the floor 16, as indicated by reference numeral 18:

25 The lid 20 has a sleeve 22 snugly, frictionally receivable within the tubular wall 14. The lid 20 has a closed top 24. A lower, open end of the sleeve 22 has a convergent end portion complementary to a divergent end portion of the open top 18 to facilitate inserting the sleeve 22 within the tubular wall 14 to close the container 12.

The tubular wall 14 extends into the spacer 30 past the level of the floor 16 and blends into a smooth tube 32 connected to the extended tubular wall 14 at a shoulder 42. The tube 32 is open-ended at its bottom as indicated by reference numeral 34. Complementally, the tubular spacer 30 has,  
5 at a high level, a vent hole 36.

In use, it is desired to have a plug of stemming material spaced a predetermined distance from a predetermined surface, for example a bottom, of a drill hole. The effective length of the spacer 30 corresponds to the desired  
10 spacing, the open bottom 34 abutting the predetermined surface. Stemming material, for example in the form of drill cuttings, is contained within the container 12. Because of the defined volume of the container 12, a correspondingly defined volume of stemming material would be provided if the container is filled.

15 The closed top 24 of the lid 20 provides a platform for supporting material to be placed on the accessory 10, for example for a pressure generating or shock wave generating substance such as an explosive.

20 The open bottom 34 of the tube 32, and the vent hole 36 allow the accessory 10 to be used in "wet" drill holes in that the spacer 30 which is only slightly narrower than the drill hole, would not unduly displace water in the drill hole away from the bottom of the drill hole. Thus, water will be contained within the spacer 30 below the floor 16 of the container 12. This will prevent  
25 an explosive to be charged from being wetted.

By way of development the tubular wall portion 14 and the extended wall portion have peripheral beads 38 extending around the tubular wall portion at the level of the floor 16. In addition, circumferentially intermittent ridges 40 are formed at longitudinally spaced positions externally on the tubular wall 14.

With reference to Figure 2, a further embodiment of an accessory in accordance with the invention is generally indicated by reference numeral 110. The accessory 110 is, in many respects, similar to the accessory 10 of Figure 1 and like reference numerals are generally used to denote like features. Furthermore, all of the features are not again described and emphasis is merely placed on differences or developments.

A first difference is that the spacer 130 is extended incorporating an upper portion integral with the extended tubular wall and having a closed top 116.

The container 112 is separate from and apart of the spacer 130. The container 112 is of generally tubular form having a tubular wall 114 which extends into a coaxial tubular skirt 119. An internal peripheral shoulder 117 is provided intermediate the tubular walls 114 and 119. It has a closed top 120.

The tubular sleeve 119 fits snugly over the upper portion of the tubular wall of the spacer 130, the overlap being determined by the internal shoulder 117 abutting against the top or floor 16 of the spacer 130. The sleeve 119 has, at its bottom, a peripheral hook formation 121 hooking

underneath an appropriate one of the intermediate ridges 140 to prevent the container 112 from being withdrawn inadvertently.

Thus, a closed container portion 115 is formed within the peripheral wall 114 intermediate the floor 116 and closed top 120, while the effective length of spacing is the distance between the floor 116 and the open bottom 134 of the spacer 130.

In use, the container 112 is inverted and is filled with stemming material, for example drill cuttings, from the closed top (which is a closed bottom when inverted) to the level of the shoulder 117. While being kept inverted, the spacer 130 is placed in position within the sleeve 119. The accessory 110 can then be orientated as required because the container volume 115 remains closed and the stemming material, to the predetermined volume, remains intact.

When the accessory 110 is placed within a drill hole, the bottom 134 abuts a predetermined surface within the drill hole, for example a bottom of the drill hole thus spacing the stemming material in the container 115 the predetermined spacing from said predetermined surface. The closed top 120 then acts as a base for supporting other material, for example an explosive.

With reference to Figure 3, a variant container 212 which can replace the container 112 of Figure 2 has a partially diverging peripheral wall 214 blending into a parallel portion and terminating in the closed top 220. The container volume 215 will generally be larger than the container volume 115 of

Figure 2. Furthermore, the diameter of the closed top 220 is larger thus being appropriate for a larger drill hole.

5 With reference to Figure 4, a developed embodiment of an accessory in accordance with the invention is generally indicated by reference numeral 310. The embodiment 310 is very similar to the embodiment of Figure 2, with two differences. First, the tubular wall 314 of the container bulges peripherally outwardly immediately before blending into the closed top 320. Secondly, and more importantly, the accessory 310 comprises a peripheral seal member generally indicated by reference numeral 340. The seal member 340 is 10 in the form of an inverted skirt 342 divided by longitudinal slits 344. It has a narrow sleeve 346 fitting snugly, with interference, over the peripheral bead 321 thus to retain it in position.

15 The peripheral seal 340 allows the accessory 310 to be substantially smaller than a drill hole for which it is intended, thus to allow the accessory 310 to be moved easily into the drill hole, for example under gravity in the case of a downwardly extending, such as a vertically downwardly extending drill hole. The inverted skirt 342 is easily shrinkable and also 20 dilatable, as facilitated by the longitudinal slits 344.

With reference to Figure 5, the accessory 310 is shown in position within a drill hole 50 which is of relatively narrow diameter. Thus, as shown by reference numeral 54, the inverted skirt 342 of the peripheral seal member 340 25 is shrunk or compressed to fit snugly within the drill hole 50. Thus, when material is passed through an open end 52 of the drill hole, the material will be checked by and supported by the peripheral seal member 340.

Figure 6 shows the accessory 310 in a relatively wide bore hole 350 in which the peripheral seal member 354 remains substantially dilated as indicated by reference numeral 354.

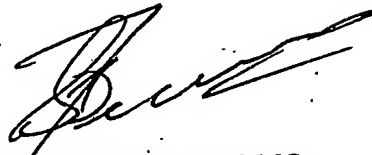
5 In use, and with reference especially to Figures 5 and 6, an explosive is supported on the accessory 310 and the peripheral seal member 340 prevents the explosive from flowing annularly past the lower portion of the accessory 310 into the bore hole. The explosive is thus located immediately above the stemming material within the container, which is spaced above the  
10 bottom or other predetermined surface of the bore hole.

With reference to Figure 7, the accessory of 310 of Figure 4 is extended by means of a second spacer 330.1 arranged in series with the initial spacer 330 and secured to the initial spacer 330 by means of a sleeve 414  
15 having an intermediate, inwardly directed shoulder 417 and oppositely extending socket formations received over, respectively, the lower end portion of the initial spacer 330, and the upper end portion of the second spacer 330.1. In this fashion, the accessory 410 is provided with an extended stem or spacer to space it further from the bottom of the drill hole. It is to be appreciated that  
20 even more spacers may be used in a similar fashion to extend the accessory even more. This allows selection, within a virtually unlimited range, in discrete steps, of the length at which the stemming material is spaced.

It is an advantage that a predetermined volume of stemming  
25 material can be spaced at a predetermined distance above a surface and that a pressure generating or shock wave generating blasting substance such as an explosive can be contained immediately above the stemming material in

accordance with this invention. The predetermined distance can be selected  
within a wide range in discrete steps.

5 DATED THE 3<sup>rd</sup> DAY OF OCTOBER 2003



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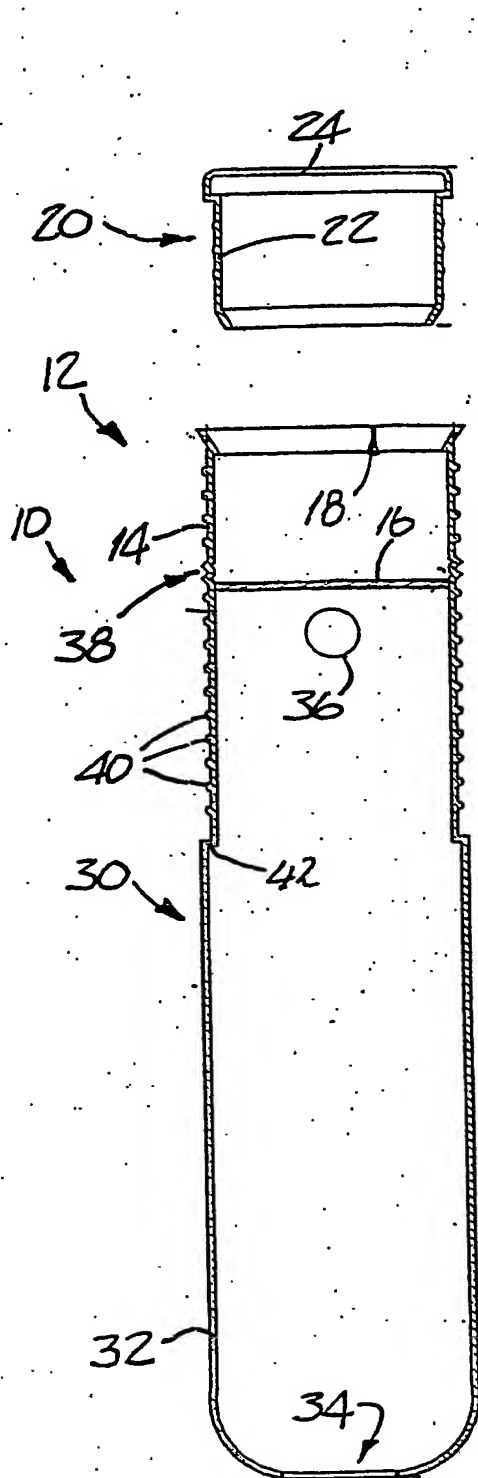


FIG 1

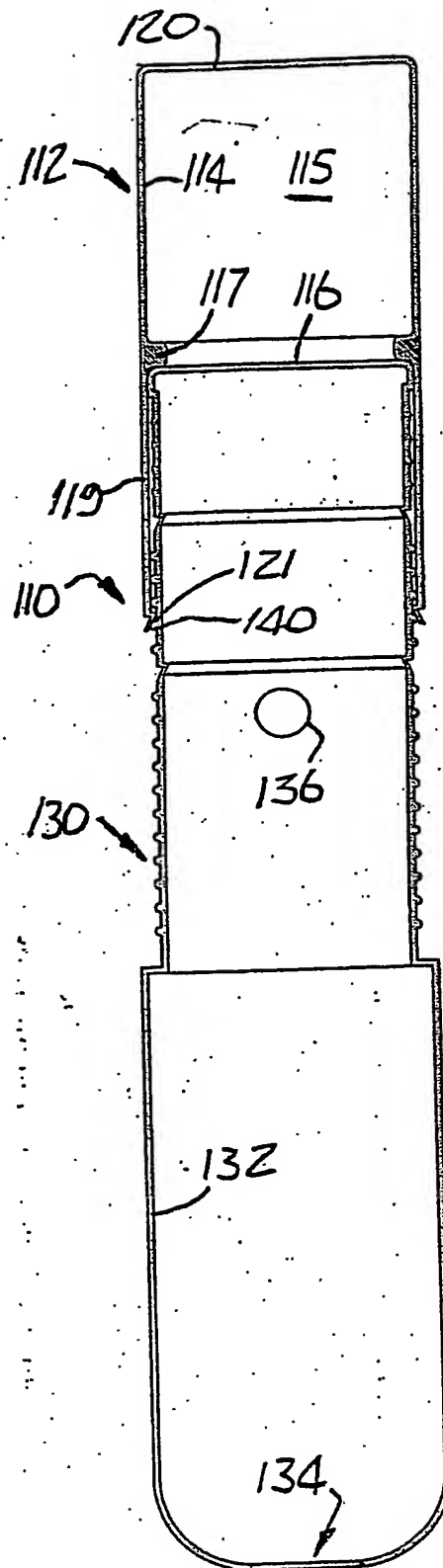


FIG 2



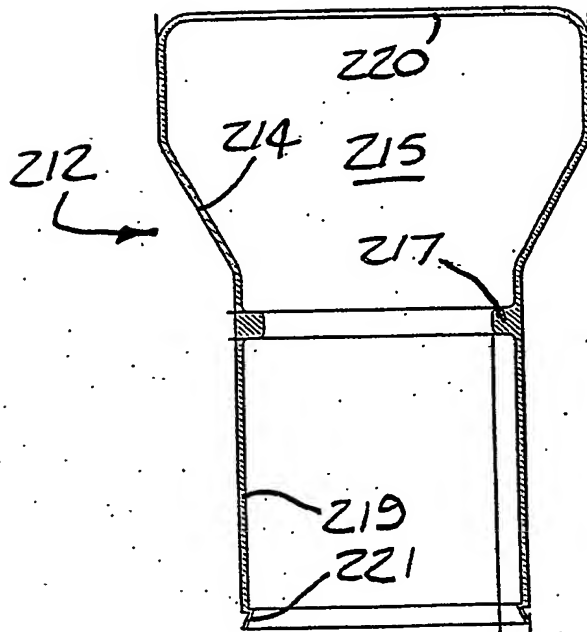


FIG 3

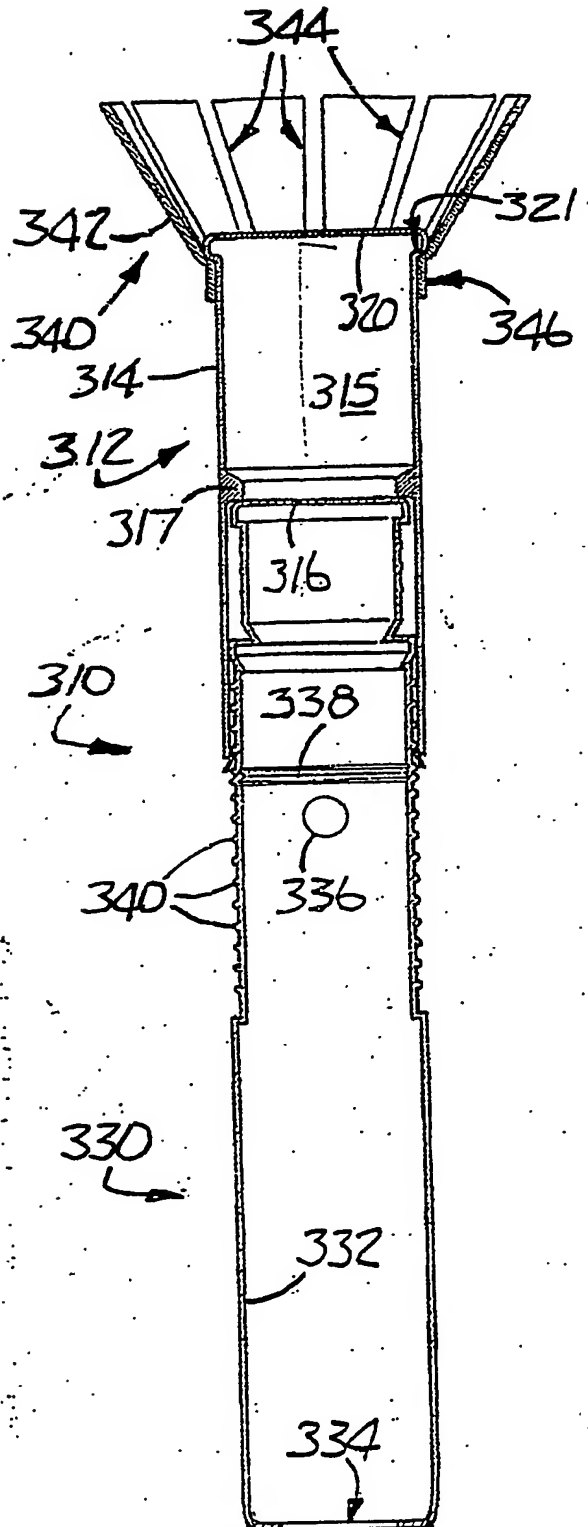


FIG 4

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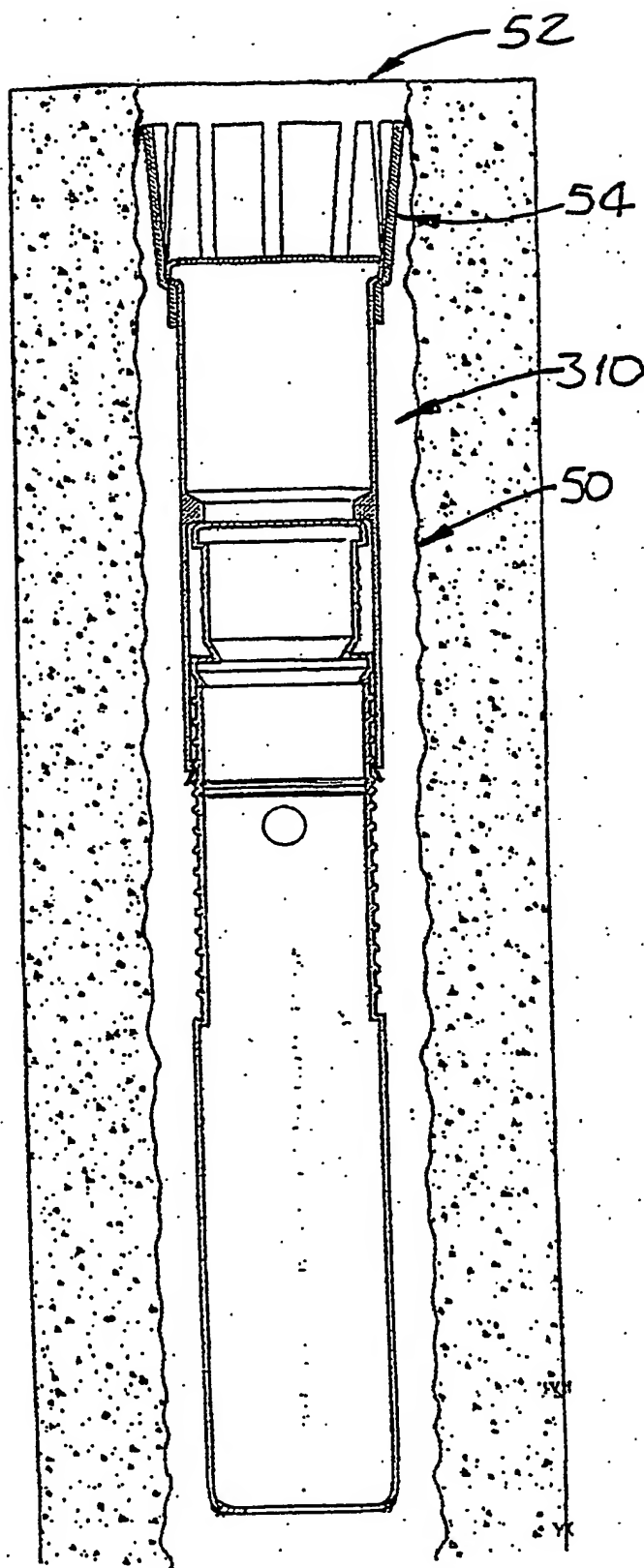


FIG 5

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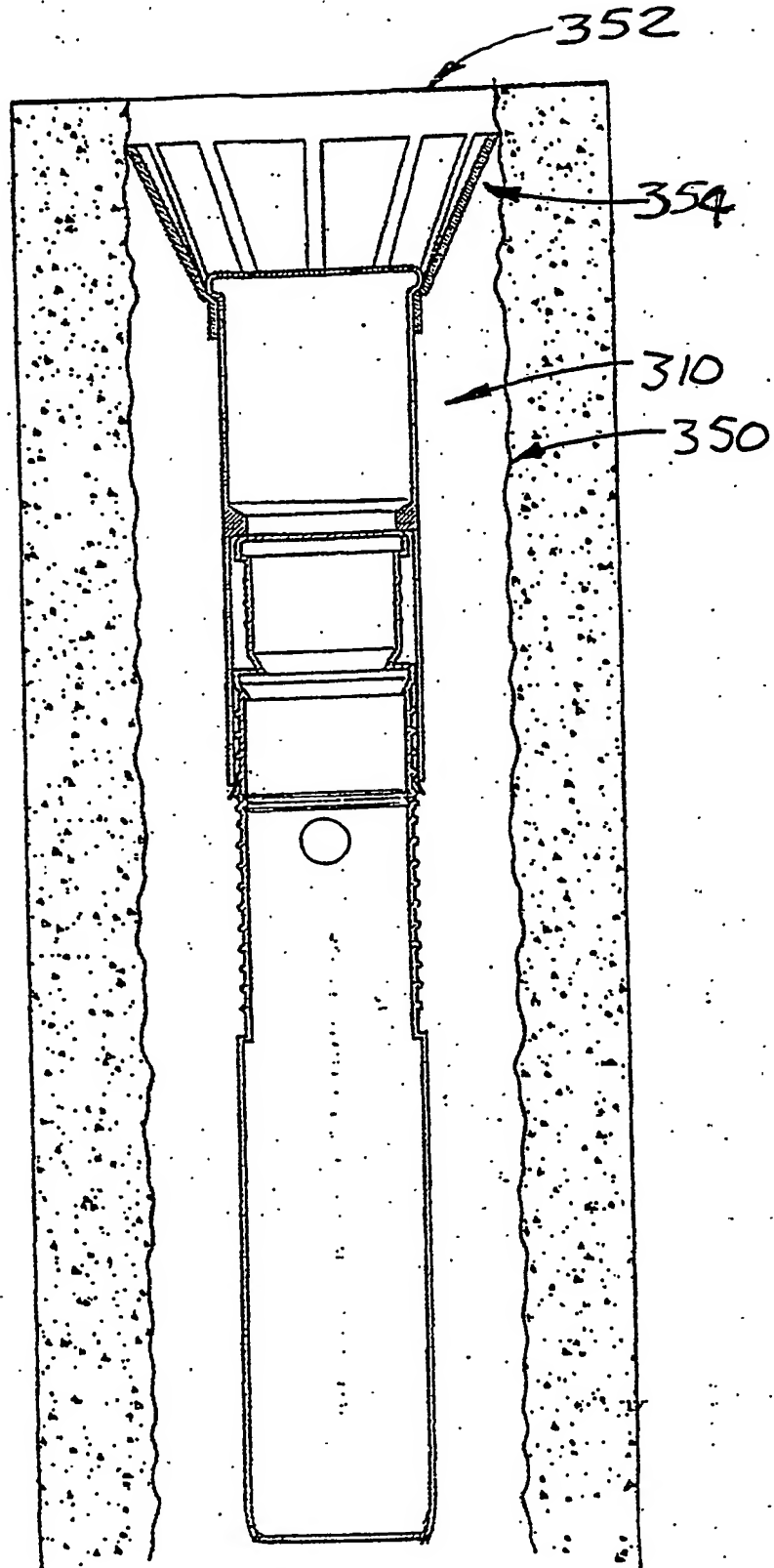


FIG 6

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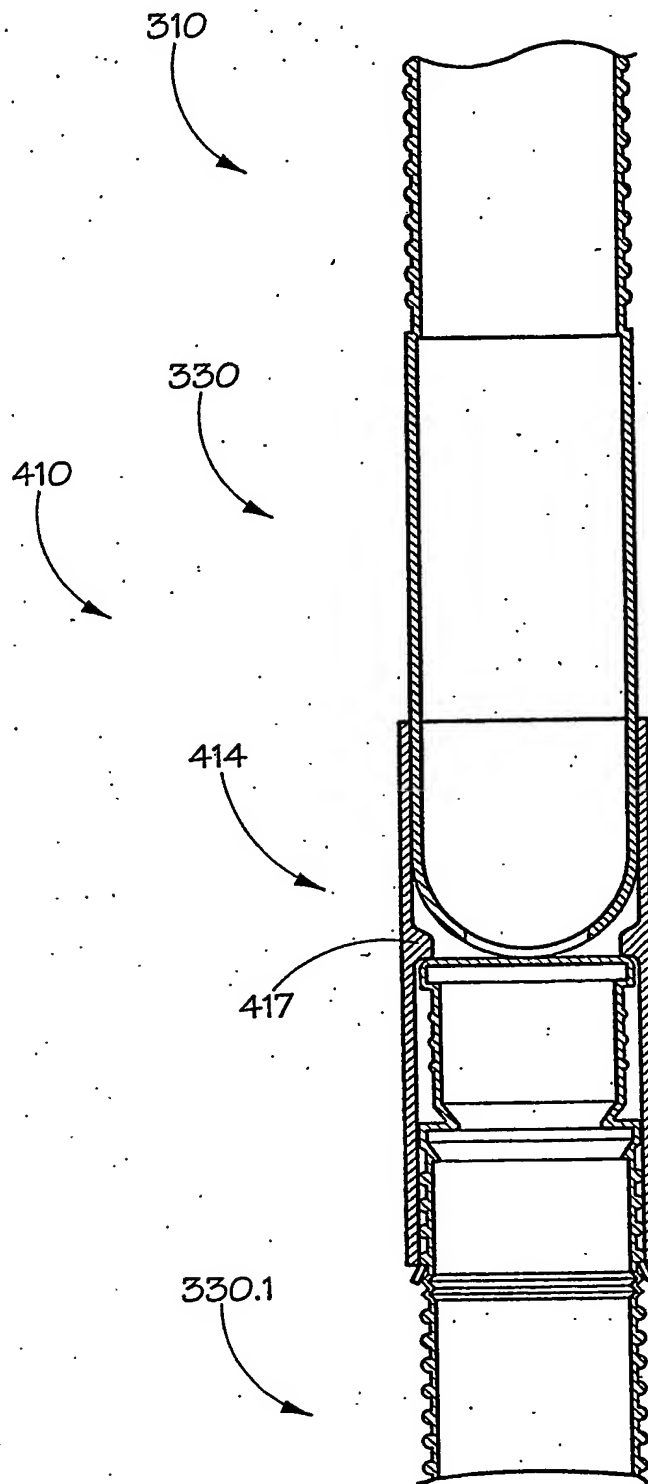


Fig 7

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